

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 6-7, 9-14 and 26 -39 are pending in this application. Claims 10-14 and 29-31 are withdrawn from consideration. By this amendment, Claims 6, 9, 26-28, 32-34, 36-37 and 39 are amended; Claim 8 is cancelled; and no new claims are added herewith. It is respectfully submitted that no new matter is added by this amendment.

In the outstanding Office Action, Claims 8, 9 and 32-37 were rejected under 35 U.S.C. § 112, second paragraph; Claims 26-28 and 32-35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Soejima in view of Japan 227444, Tanioka, Eldridge '374 and Sato; Claims 6-9 and 26-28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Eldridge '013 in view of Japan 227444 and Tanioka; and Claims 6-7 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over IBM in view of Japan 227444 and Tanioka.

All of the amendments are fully supported by the original disclosure of this application and therefore do not constitute the introduction of any new matter into this case. Specifically, the second film-shaped supporting body, which has elasticity, is supported by page 42, lines 4-12, page 43, lines 7-15 and Figs. 9-12. The contactor essentially filled with one or more metals is fully supported by page 22, lines 14-21.

With regard to the rejection of the claims under 35 U.S.C. § 112, Claims 9 and 32 are amended and Claim 8 is cancelled. Accordingly, it is respectfully requested that the rejection of Claims 9 and 32-37 be withdrawn.

With regard to the rejections under 35 U.S.C §103(a), those rejections are respectfully traversed. Specifically, with respect to the rejection of Claims 26-28 and 32-35 under 35 U.S.C. § 103(a) as being unpatentable over Soejima in view of Japan 227444, Tanioka,

Eldridge '374 and Sato, this rejection is respectfully traversed in view of the amendments to the claims.

Exemplary embodiments of the present invention, as defined in the amended Claim 26, are directed to a probe for use in contacting with an electrode of a test subject formed on a substrate to inspect electrical characteristics of the test subject, which includes a beam having a leading end portion, an intermediate portion and a base end portion, the base end portion being a portion for fixing the probe on a probe card; and a contactor having a substantially trapezoidal shape and disposed at the leading end portion of the beam. The leading end portion is a portion for making a contact with the test subject via the contactor and an inner part of the contactor being essentially filled with one or more metals.

Further, as claimed in the amended Claim 32, a probe card includes the plurality of probes each of which the contactor has a substantially trapezoidal shape and an inner part of the contactor being essentially filled with one or more metals, and a probe card main body.

In accordance with exemplary embodiments of the present invention, by using the substantially trapezoidal contactor, a stable contact with an electrode pad can be obtained to thereby make a secure electrical connection; and therefore a highly reliable inspection can be performed. Further, since an inner part of the contactor is essentially filled with one or more metals, in other words, the whole body of the contactor is filled with metals, high abrasion resistance can be provided. Thus, the probe in accordance with exemplary embodiments can be used repeatedly although wears down.

In contrast, Soejima fails to disclose a trapezoidal shaped contactor as admitted by the Office Action. Further, since an end contact terminal 10 of a probe 21 has a curved shape of a protrusion 12; and an inner part of the end contact terminal 10 is empty. Soejima also fails to teach that an inner part of the contactor is essentially filled with one or more metals.

However, the Office Action alleges that Japan 227444 or Tanioka discloses this feature and

further alleges that the combination would render Claims 26 and 32 obvious. Applicants respectfully disagree.

Japan 227444 is related to an element inspecting probe for preventing height dispersion and damage of a semiconductor element substrate by forming a flat surface into an elongated shape whose length and width are different from each other or constructing the flat surface of an assembly of a plurality of areas having an elongated shape property. However, a body of the contactor 1 is made of single crystal silicon; and the body 1 is coated with an electrode connection 4. Please see Figs. 1 and 6(b).

Furthermore, Tanioka only discloses that a test probe includes a sheet body which is suited for a smaller pitch of electrodes in the bare chip and a projecting electrode 12 which consists of a silicon projection 41 and a Cu film 62, a Ni film 70, an Au film 71.

As such, neither Japan 227444 nor Tanioka discloses the probe which has a substantially trapezoidal shaped contactor of which an inner part is essentially filled with one or more metals. Instead, the contactor is made of silicon, for example, single crystal silicon. Therefore, the cited references are silent on the desired result of exemplary embodiments of the present invention, which is obtained by forming the body of the contactor with metallic material.

Accordingly, in view of the above, it is respectfully submitted that the prior art references are deficient in its ability to render obvious the features of the present invention as defined in the pending Claims 26 and 32. It is most respectfully requested that this rejection be withdrawn.

Additionally, it is also believed that Claims 27-28 and 33-35, indirectly or directly depending on Claims 26 and 32 are allowable for the same reasons indicated with respect to the amended Claims 26 and 32, as well as for the additional features recited therein.

With respect to the rejection of Claims 6-9 and 26-28 under 35 U.S.C. § 103(a) as being unpatentable over Eldridge 013 in view of Japan 227444 and Tanioka

As recited in amended Claim 6, a probe array is used in a manufacturing process of a probe card. The probe array includes a second film-shaped supporting body having elasticity; and a plurality of probes adhered onto one surface of the second film-shaped supporting body. Further, each probe where an inner part of the contactor is essentially filled with one or more metals includes a beam and a contactor having a substantially trapezoidal shape; and a top portion of the contactor is embedded in the second film-shaped supporting body.

In contrast, Eldridge '013 is directed to a micro miniature spring contact used in providing microelectronic components such as active semiconductor devices which includes a raised topological feature 278 for connection with terminals 422 of an electronic component 420.

Regarding the trapezoidal shaped contactor, Eldridge '013 fails to disclose the trapezoidal shaped contactor, as admitted by the Office Action. Further, Eldridge '013 is totally silent on the fact that the inner part of the contactor is essentially filled with one or more metals. As mentioned above, Japan 227444 and Tanioka fails to disclose the contactor of which the inner part is essentially filled with one or more metals and having the substantially trapezoidal shape. Namely, the prior art references fail to teach a substantially trapezoidal shaped contactor essentially filled with one or more metals.

Regarding the second film-shaped supporting body, the Office Action alleges that the space transformer component 408 in Eldridge '013 corresponds to the second film-shaped supporting body. However, since the probe array is not a probe card of a final product but an intermediate product for use in manufacturing process of the probe card, the second film-shaped supporting body of the probe array can not be correspondent to the probe card main body of the probe card. More particularly, since the probe array is used for manufacturing

the probe card, i.e., transferring the probes on one surface of the second film-shaped supporting body to one surface of the probe card main body, the space transformer component can not be read as the second film-shaped supporting body.

Further, Eldridge '013 discloses that a probe card assembly includes the space transformer component 408, whereupon the base end portions are suitably soldered or brazed 410 (see, column 6, lines 60-67, column 15, lines 50-59 and Fig. 4B). Accordingly, the space transformer component 408 of the probe card assembly in Eldridge '013 corresponds to the probe card main body of the probe card of the final product in accordance with the present invention. With respect to the Office Action's comment regarding the second film-shaped supporting body, since a top portion of the topological feature 278 in Eldridge '013 is not embedded in the space transformer component 408, Eldridge '013 fails to teach or even suggest the probe array, as recited in the amended claim 6 (See, Fig. 4B).

Further, Eldridge '013 is materially silent on the fact that the second film-shaped supporting body has elasticity.

Furthermore, the Office Action alternatively asserted that the sacrificial substrate 404 can be read as the second film-shaped supporting body. However, the sacrificial substrate 404 corresponding to the second film-shaped supporting body is made of silicon, such as a silicon wafer 202. Namely, the sacrificial substrate 404 is not elastic but rigid. Whereas, the second film-shaped supporting body has elasticity since it is made of a material such as a vinyl chloride, polyethylene.

Resultantly, all the probes 402 are soldered or brazed 410 to the terminals 406 of the space transformer 408 at a time according to Eldridge '013, while each probe is attached to the probe card individually whenever needed in accordance with the present invention. Therefore, a sufficient effect which provides a probe for the manufacture thereof which may

be commonly and generally used for the probe cards in accordance with the present invention, each of which having a different array pattern of the probes can be also obtained.

Accordingly, since none of the references discloses the above mentioned features of the presently claimed inventions, Claims 6-7 and 9 are patentable in its present form.

Regarding Claims 26-28, since none of the prior art references cited by the Examiner disclose the feature of the present invention as discussed above, Claims 26-28 are patentable for the same reasons indicated with respect to Claims 6-7 and 9.

With respect to the rejection of Claims 6, 7 and 9 under 35 U.S.C. § 103(a) as being unpatentable over IBM in view of Japan 227444 and Tanioka, as stated above, regarding the contactor, neither Japan 227444 nor Tanioka shows the inventive features of the present invention that an inner part of the contactor being essentially filled with one or more metals and having the substantially trapezoidal shaped contactor.

With respect to the second film-shaped supporting body, a rubber layer 9 of the test probe 4 in IBM corresponds to the probe card main body of the probe card in accordance with the present invention, since the test probe 4 is correspondent to the probe card, in the same manner with Eldridge '013.

Further, even if the rubber layer 9 corresponds to the second film-shaped supporting body, the electrodes 11 or contacts 15 contact with the terminals 3 of the integrated circuit chip contact 2 in order to test the integrated circuit chip. Namely, a top portion of the contactor is not embedded in the rubber layer of the test probe, unlike the present invention.

Accordingly, it is most respectfully submitted that the Claims 6, 7 and 9 define patentable inventions over the prior art references and, therefore are allowable.

Consequently, since none of the prior art references cited by the Examiner disclose the above mentioned features of the present invention and since there is no motivation to

include the features, it is respectfully requested that the rejections be withdrawn; and that Claims 6-7, 9, 26-28 and 32-39 be allowed in its present form.

Applicants believe that this is a full and complete response to the Office Action. For the reasons discussed above, applicants now respectfully submit that all of the pending claims are in complete condition for allowance. Accordingly, it is respectfully requested that the rejections be withdrawn; and that Claims 6-7, 9, 26-28 and 32-39 be allowed in their present form.


Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact the undersigned representative at the below listed telephone number.

Respectfully submitted,

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